

Serial No. 10/051,510

### REMARKS

This amendment is responsive to the Official Action dated January 29, 2004.

Claims 1-24 were pending in the application.

By way of this amendment, the Applicant has amended claims 1, 2, 13, 18, 19 and 20 and canceled claims 8, 12, 17 and 24.

Claims 1-7, 9-11, 13-16, and 18-23 remain pending in the Application.

#### Rejections under Section 102(b):

Claims 1, 4-12, 15-17 and 20-24 were rejected under 35 USC §102(b) as being anticipated by Morgan USP 5,574,738.

The Applicant respectfully traverses the rejection on the grounds that the invention in the present application and the invention in Morgan (US patent 5,574,738) are completely different in their intentions and purposes as well as in construct. Reconsideration is respectfully solicited in light of the following arguments and amendments.

The inventions in this application and in Morgan (US patent 5,574,738) have one common element, namely that they both place an absorbing layer within the vertical structure of a VCSEL. However, they otherwise have significant differences that are directly related to the intended function of the absorbing layer.

In Morgan, the intended function of the absorbing layer is to interact with (absorb) light within the optical cavity's standing wave pattern so as to force the VCSEL to self-pulse. The specification of Morgan (US patent 5,574,738) explicitly states in several places that the VCSEL is self-pulsing and that it includes a saturable absorber to accomplish the self-pulsing.

*Under controllable operating conditions, the saturable absorber, strategically sized and placed, will force the VCSEL to self-pulsate (in the GHz-regime) at rates related to the local intensity, absorption, lifetime, and carrier density of the saturable absorber. (Abstract of the Disclosure)*

*Under appropriate operating conditions, the saturable absorber, strategically placed, forces the VCSEL to self-pulsate (in the GHz-regime) at rates related to the local intensity, absorption, lifetime, and carrier density at the saturable absorber. This characteristic is exploited as a technique to frequency modulate a VCSEL. Col. 2, lines 42-48.*

Serial No. 10/051,510

It is well known that in order to enable the self-pulsing, the saturable absorber must be able to interact with the light in the optical cavity's standing wave pattern (the light exiting the cavity). Although the Morgan (US patent 5,574,738) specification only states that the absorber is between the first and second terminal, implying anywhere between those two terminals, there are practical restrictions on its placement. The saturable absorber in Morgan must avoid being placed exclusively at a null of the cavity standing wave pattern, where it would not be able to interact with the light in that pattern. There are many such nulls in the cavity and in the Distributed Bragg Reflector mirrors. The Specification of Morgan fails to specifically mention this restriction.

In the present application, the function of the absorber actually is to prevent self-pulsing of any kind and especially to eliminate, or at least to significantly reduce, the effects optical feedback into the VCSEL, which can cause unwanted self-pulsing, manifested as noise. The absorber then must never saturate to properly perform its intended function and should interact as minimally as possible with the light in the cavity standing wave pattern while strongly interacting with (absorbing) only light externally reflected back into the cavity. Thus, the absorbing layer should be positioned at or near a null in the standing wave pattern [just the opposite of the absorber in Morgan], and near the emitting surface (facet), through which externally reflected light could re-enter the cavity. Amended claims 1 and 20 now reflect this particular placement of the absorbing layer.

Accordingly, it is submitted that the entirety of the invention in this application is totally ~~un~~anticipated in Morgan. In particular, the absorber in this application differs from the one in Morgan in its function, as to its principal characteristic (never saturating versus saturable), and in its placement in the VCSEL vertical structure.

Reconsideration and allowance is respectfully solicited.

Allowable Subject Matter:

Claims 2, 3, 13, 14, 18, and 19 were objected to as being dependent upon rejected base claims, but would be allowable if rewritten in independent form.

Accordingly, the Applicant has rewritten only claim 2 (the broadest of the allowable claims) in independent form, as both claims 13 and 18 were also ultimately dependent from claim 1.

Serial No. 10/051,510

Accordingly, claims 1-7, 9-11, 13-16, and 18-23 are now believed to be in condition for allowance and the application ready for issue.

Corresponding favorable action is respectfully solicited.

PTO is authorized to charge any additional fees incurred as a result of the filing hereof or credit any overpayment to our account #02-0900.

Respectfully submitted,



Stephen J. Holmes  
Reg. No. 34,621

BARLOW, JOSEPHS & HOLMES, Ltd.  
101 Dyer Street  
5<sup>th</sup> Floor  
Providence, RI 02903  
401-273-4446 (tel)  
401-273-4447 (fax)  
sjh@barjos.com